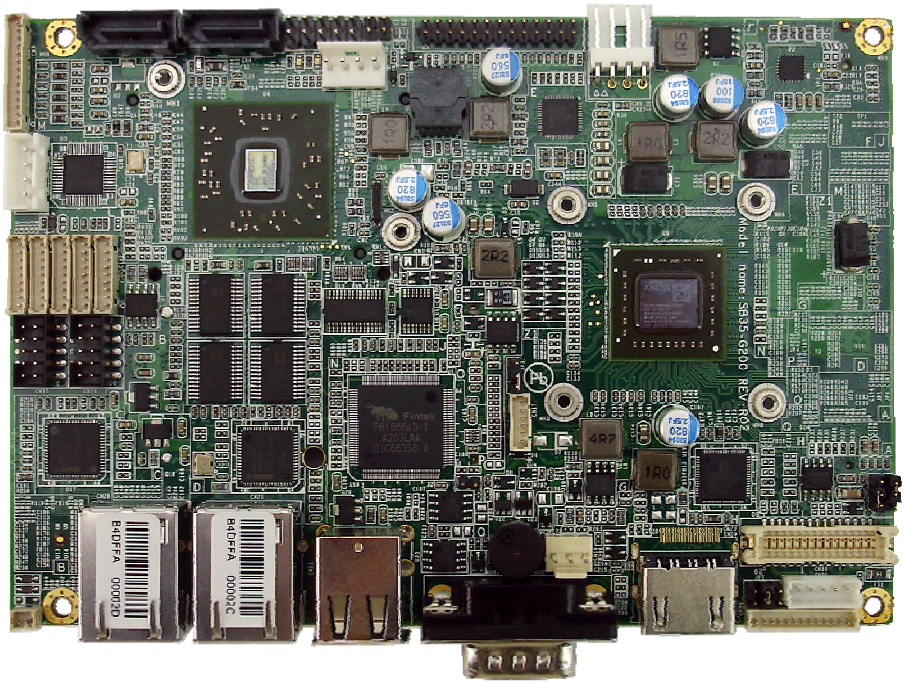
SB35-G2000 Series

SBC industrial Motherboard



User Manual

3.5” Industrial Single Board Computer

With AMD Processor

(2st Edition 2/20/2013)

All information is subject to change without notice.

Approved by	Checked by	Prepared by

RECORD OF REVISION

Version	Date	Page	Old Description	New Description	Remark
V1.0	2013.Feb.1	all		Initial Release	
V1.1	2013.Feb.20	11		Add Location of Connectors and Jumpers	
		17	CN5 Pin4: +5V	+12V	

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Packing List

Before installation, please ensure the following items have been shipped:

- 1 x SB35-G200X
- 1 x VGA cable
- 1 x SATA Power cable
- 1 x SATA Signal cable
- 2 x RS232 cable
- 1 x USB cable(2 Connecter)
- 1 x DVD-ROM for manual (in PDF format) and drivers

If any of these items should be missing or damaged, please contact your distributor or sales representative immediately.

Ordering Information

Model Number Description

SB35-G2002-01 ***(****Fanless Design)*
AMD T16R (615MHz) APU with GPU HD 6250, 3.5" SBC Board, Mini Card, 2GbE, 6COM, 8-bit GPIO, 6USB, VGA, HDMI, CFast, 12VDC

SB35-G2003-01 ***(****Fanless Design)*
AMD T40R (1 GHz) APU with GPU HD 6250, 3.5" SBC Board, Mini Card, 2GbE, 6COM, 8-bit GPIO, 6USB, VGA, HDMI, CFast, 12VDC

SB35-G2004-01
AMD T40N (1 GHz) APU with GPU HD 6290, 3.5" SBC Board, Mini Card, 2GbE, 6COM, 8-bit GPIO, 6USB, VGA, HDMI, CFast, 12VDC

SB35-G2006-01
AMD T56N (1.65GHz) APU with GPU HD 6320, 3.5" SBC Board, Mini Card, 2GbE, 6COM, 8-bit GPIO, 6USB, VGA, HDMI, CFast, 12VDC

Optional Accessories

- 2.5” SATA Hard Disk Drive
- CFast Memory Card
- ADAPTER,12V,7.0A,84W.
- Heat Sink with Fan
- Audio Cable(Line in、Line out、MIC)
- SATA Power cable
- SATA Signal cable
- RS232 cable
- USB cable(2 Connecter)

Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
4. Keep this equipment away from humidity.
5. Put this equipment on a firm surface during installation. Dropping it or letting it fall could cause damage.
6. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. All cautions and warnings on the equipment should be noted.
9. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
10. Never pour any liquid into an opening. This could cause fire or electrical shock.
11. If any of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage.
12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20°C (-4°F) OR ABOVE 70°C (158°F). IT MAY DAMAGE THE EQUIPMENT.

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1.0 INTRODUCTION

1.1 About SB35-G2000 Single Board Computer With AMD Processor

SB35-G2000 based on AMD Fusion technology delivers a complete, full-feature embedded platform and incorporate the new low-power, x86 CPU with a world-class DirectX 11-capable GPU on a single piece of silicon. It is the perfect solution for application that require low power and significant graphic performance in a small form factor. The SB35-G2000 integrate high performance solutions, support system memory DDR3 up to 4GB, three types of storage device are considered, SATA interface, mSATA and CFast. High speed internet connectivity, it offers two ports of Gigabit Ethernet. And rich IO interface, 6 COM ports, 6 USB and 8-bit digital IO. SB35-G2000 provide three types of display interface, VGA, HDMI and dual 24-bit LVDS, as well as it supports dual display feature through VGA+HDMI, VGA+LVDS or HDMI+LVDS.SB35-G2000 is a great choice for customers who used embedded board for high performance, multi-media and small form factor. It is ideal for applications such as industrial control,digital signage, transportation, POS, information Kiosk, medical, casino gaming and factory automation.

1.2 FEATURES

- Embedded AMD G-series Dual Core/Single CoreProcessor
- Low Power Consumption
- System Memory Support DDR3 up to 4GB.
- Multi Display Dual 24-bit LVDS, HDMI or VGA
- High Resolution Display HDMI up to 1920x1080, VGA1920x1200 (T56N up to 2560X1600)
- Support High Graphic Performance DirectX 11, 2D/3D Acceleration
- Support two GbE
- Rich I/O Interface 6 COM, 2 SATA, 6 USB, 8-bit GPIO
- Support 3 Types Storage Interface, SATA, mSATA, CFast
- Audio Interface Line-in, Line-out, MIC, Speaker Out
- Extended Interface Mini Card Socket
- 12V DC Input
- Wide Temperature Operation
- Dimension 146x101.6 mm (5.75” x 4”)

1.3 SPECIFICATIONS:

System

Processor

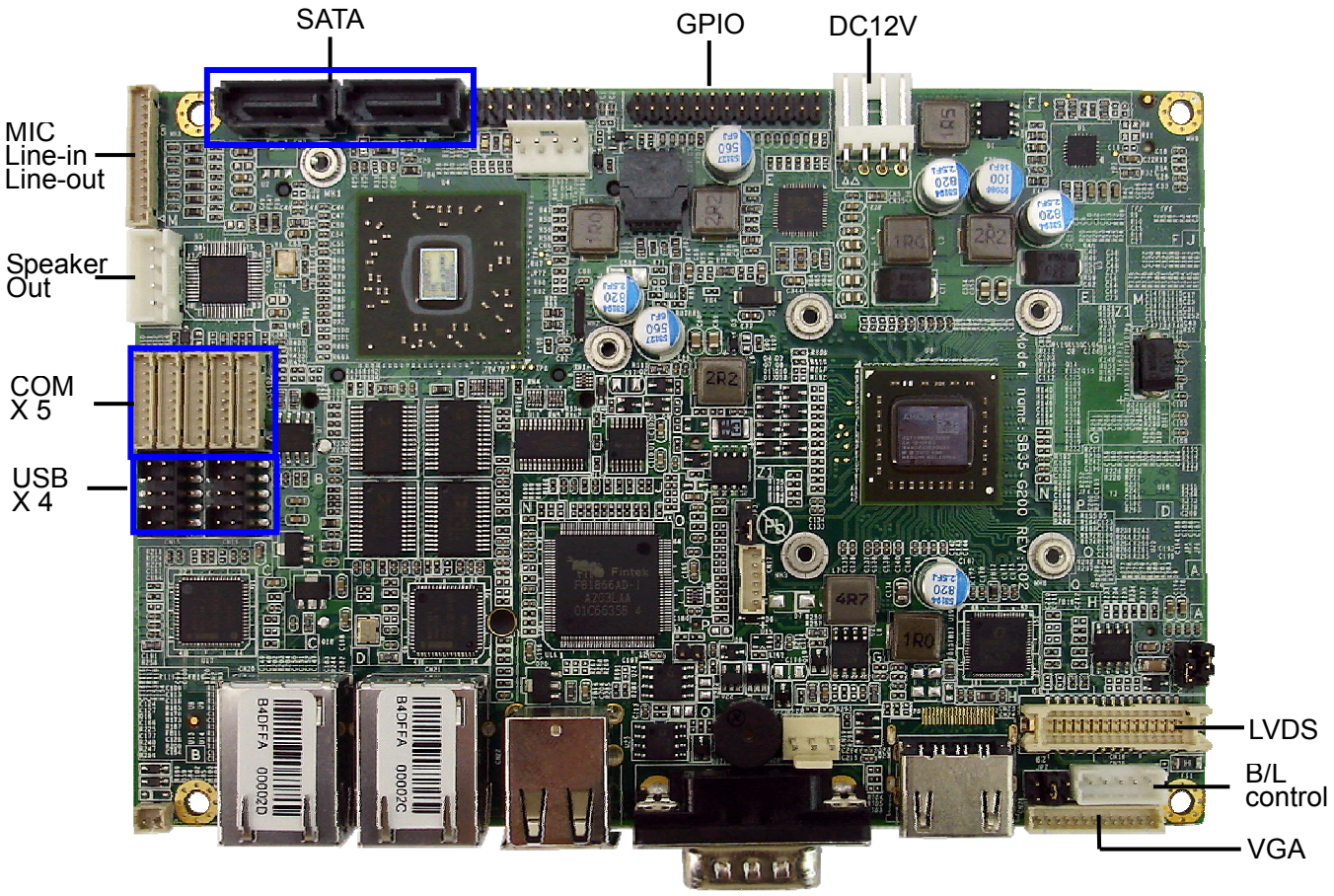
Model Name	APU	GPU
SB35-G2006	T56N (1.65GHz) Dual Core	HD6320
SB35-G2004	T40N (1.0GHz) Dual Core	HD6290
SB35-G2003	T40R (1.0GHz) Single Core	HD6250
SB35-G2002	T16R (615MHz) Single Core	HD6250

Chip Set	AMD A55E
System Memory	204-pin SODIMM x1, Max. 4GB DDR3-1333 (DDR3-1333 for T56N)
Ethernet	Speed: 10/100/1000 Base-TX, Controller: x2 Intel® 82583V *Connector: x2 RJ45 on rear IO side*
Storage	*SATA (3.0G/s) x2 ,CFast x1* *mSATA optional (support either mSATA or full size mini card) x1*
Audio	Audio Chipset Realtek ALC269 *Line-out, Line-in, MIC, Speaker out*
Display	AMD G-series GPU Supports Hardware DirectX11 HDMI display resolution up to 1920x1080 VGA display resolution up to 1920X1200 (T56N up to 2560x1600) LVDS support dual channel 24-bit
Expansion	Full size mini card x1
IO Chipset	Fintek F81866AD
Rear IO Interface	RJ45 GbE x2 ,USB 2.0 x2 ,COM (RS232/422/485) x1 ,HDMI x1
On Board IO Interface	USB x4, COM (RS232) x5, VGA x1, LVDS Dual 24-bit x1 Audio Line-in, Line-out, MIC, 8-bit GPIO, Speaker out
BIOS	AMI Plug & Play BIOS
Environment	*Operation Temperature -20°C ~ 60°C* *Storage Temperature -30°C ~ 80°C* *Operation Humidity 0~90% , non-condensing*
Power Input	*Single DC 12V*
Board Size	*5.75" x 4" (146mm x 101.6mm)*

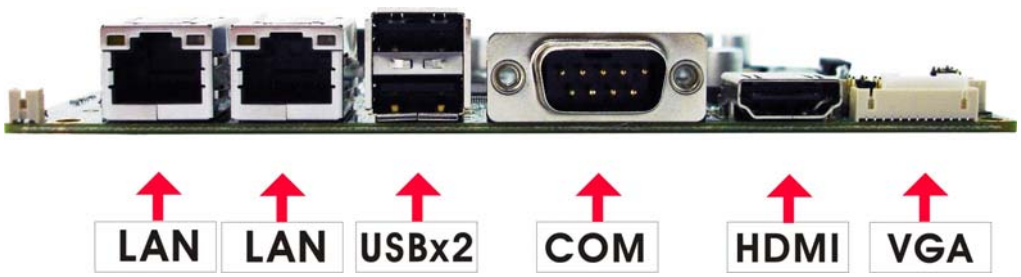
2.0 HARDWARE INSTALLATION

2.1 General System Information

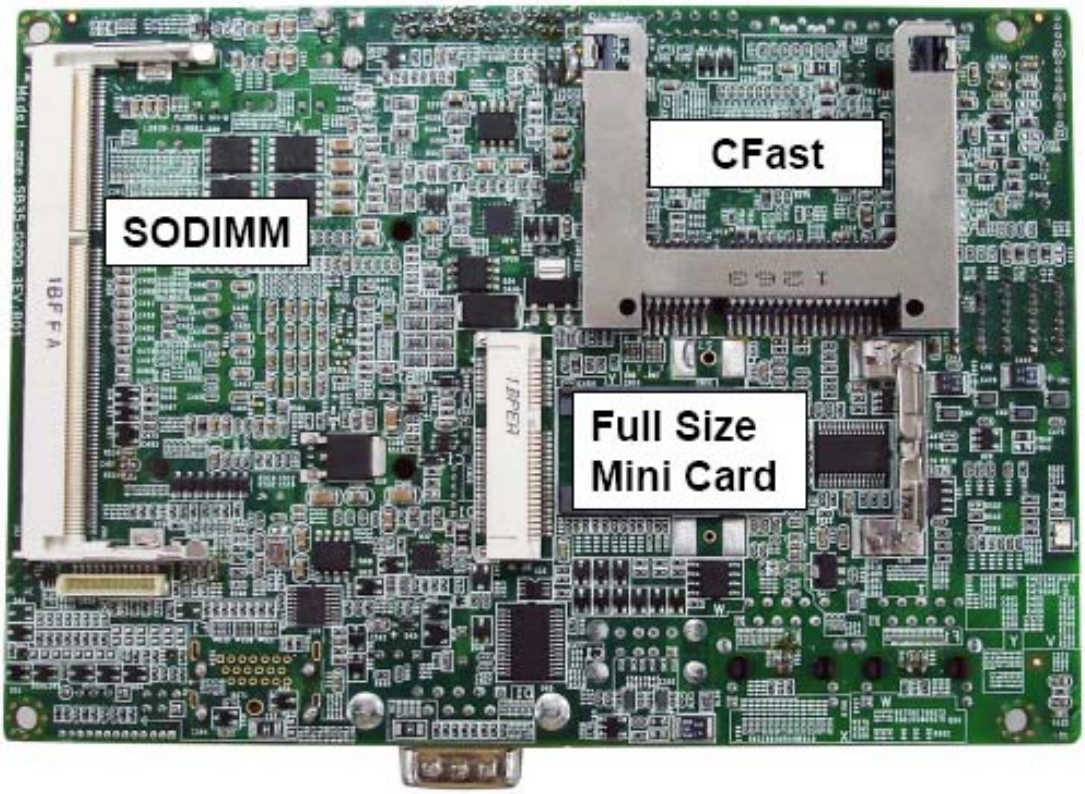
Top View



Rear IO View

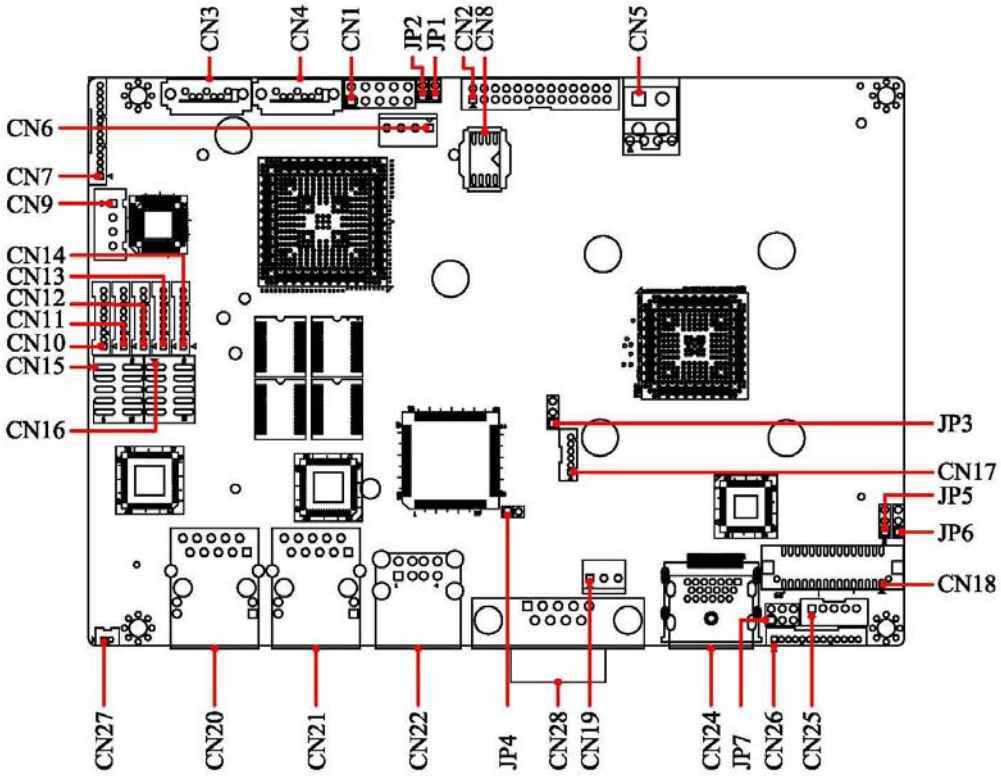


Bottom Side View



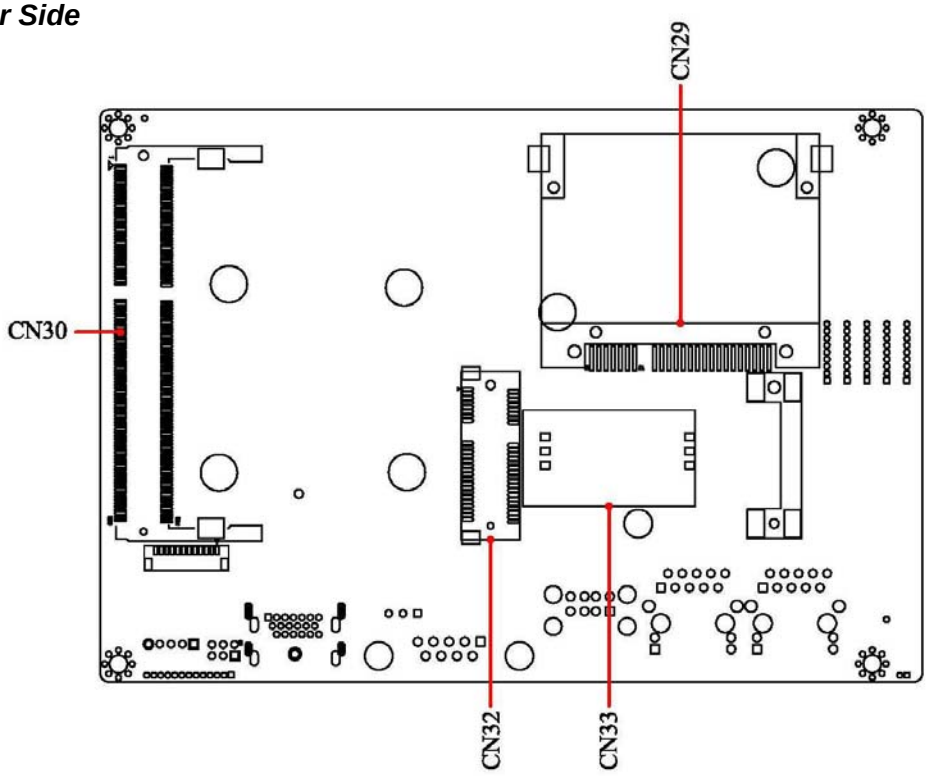
2.2 Location of Connectors and Jumpers

Component Side



Component Side

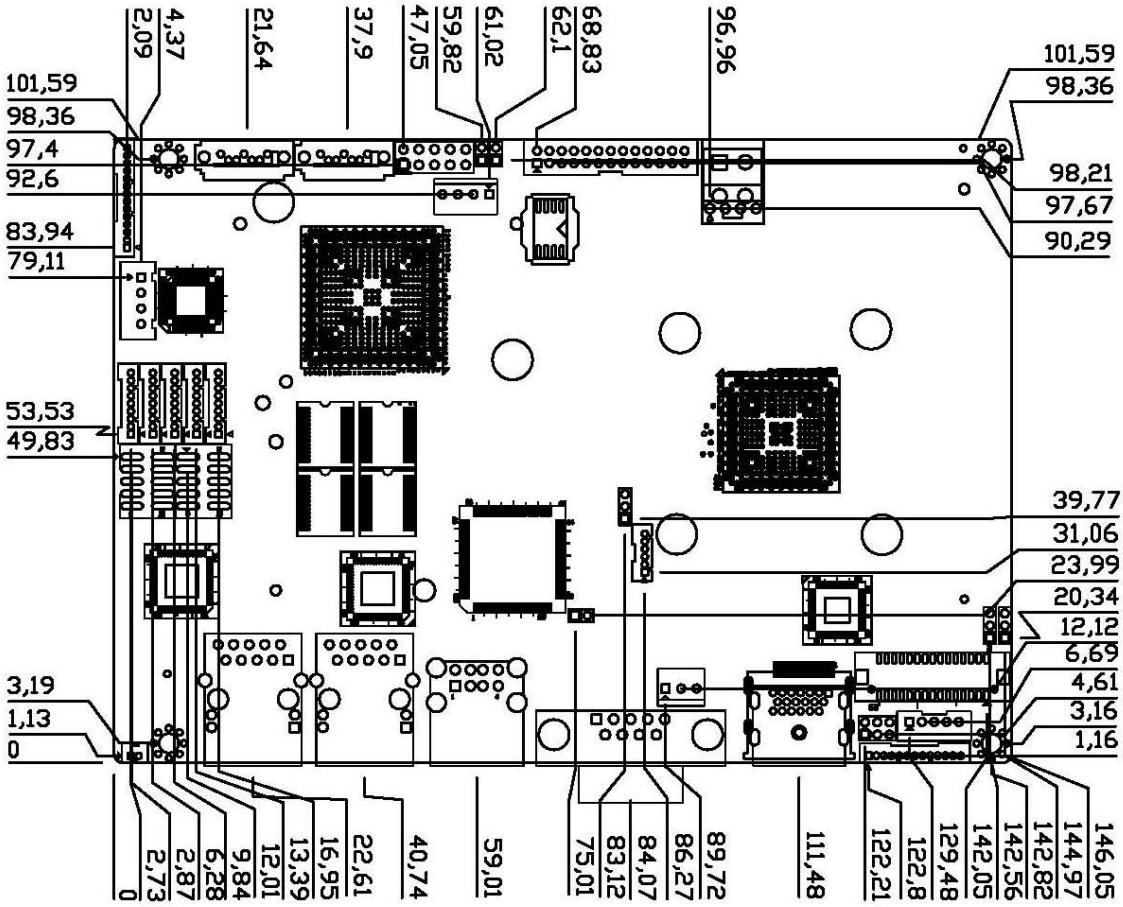
Solder Side



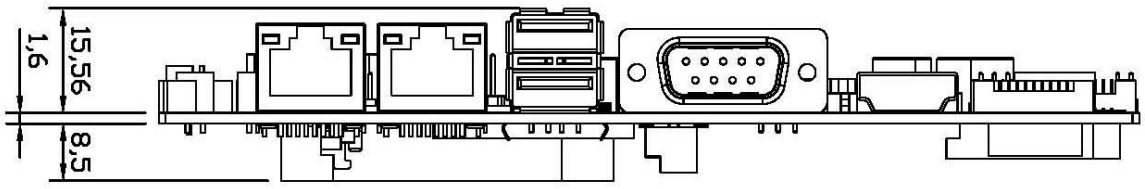
Solder Side

2.3 Mechanical Drawing

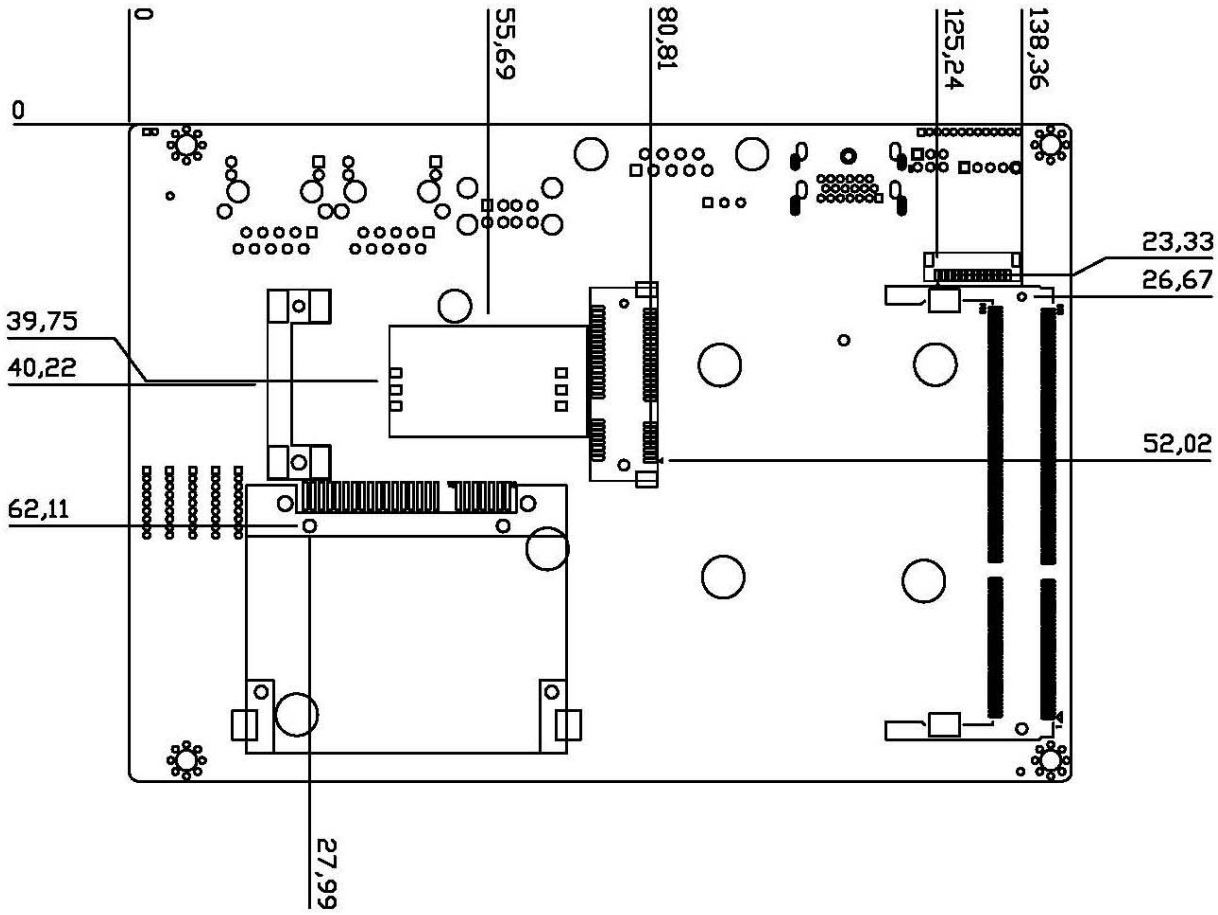
Component Side



Component Side



Solder Side



Solder Side

2.4 List of Jumpers

The board has a number of Jumpers that allow you to configure your system to suit your application.

Label	Function
JP1	Power pin7 for SATA DOM
JP2	Power pin7 for SATA DOM
JP3	Clear CMOS
JP4	AT/ATX Power mode
JP5	LCD Backlight Voltage Selection
JP6	LCD panel Voltage Selection
JP7	COM2 Ring/+5V/+12V Selection

2.5 List of Connectors

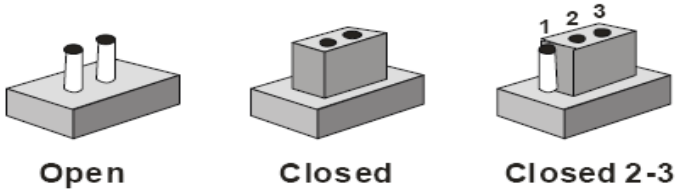
The board has a number of Jumpers that allow you to configure your system to suit your application.
The table below shows the function of the board's connectors:

Label	Function
CN1	Front Panel
CN3	SATA connector
CN4	SATA connector
CN5	ATX 4Pin Power Connector
CN6	SATA Power Connector
CN7	Audio Connector
CN9	Speaker Connector
CN10	COM1 Connector
CN11	COM5 Connector
CN12	COM6 Connector
CN13	COM3 Connector
CN14	COM4 Connector
CN15	USB Connector
CN16	USB Connector
CN17	PS2 KB/MS Connector
CN18	LVDS Connector
CN19	FAN Connector
CN20	GIGA LAN
CN21	GIGA LAN
CN22	USB Dual Port Connector
CN24	HDMI Connector
CN25	Backlight Connector

CN26	VGA Connector
CN27	Battery Connector
CN28	COM2 Connector
CN29	CFast Connector
CN30	DDR3 Connector
CN32	Mini Card
CN33	SIM Card

2.6 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.
To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers.
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change.
Generally, you simply need a standard cable to make most connections.

Pin7 Power Selection for SATA DOM

JP1、JP2	Function	
1-2 Closed	Pin7 with power	
1-2 Open	Pin7 without power	(Default)

Clear CMOS Selection

JP3	Function	
1-2	Normal	(Default)
2-3	Clear CMOS	

AT/ATX Selection

JP4	Function	
1-2 Closed	AT	(Default)
1-2 Open	ATX	

LCD Backlight Voltage Selection

JP5	Function	
1-2	+5V	(Default)
2-3	+12V	

LCD Panel Voltage Selection

JP6	Function	
1-2	+5V	
2-3	+3.3V	(Default)

COM2 Ring/+5V/+12V Selection

JP7	Function	
1-2	+12V	
3-4	Ring	(Default)
5-6	+5V	

2.7 Connector Pin Assignment

Front Panel Connector (CN1)

Pin	Signal
1	GND
2	PWR_BTN(-)
3	HDD_LED(-)
4	+3.3V
5	Buzzer
6	+5V
7	GND

8	PWR_LED(+)
9	GND
10	Reset(-)

ATX 4Pin Power Connector (CN5)

Pin	Signal
1	NC
2	GND
3	GND
4	+12V

SATA Power Connector (CN6)

Pin	Signal
1	+12V
2	GND
3	GNF
4	+5V

Audio Connector (CN7)

Pin	Signal
1	MIC
2	MIC_VREF
3	GND
4	GND
5	LINEIN_L
6	NC
7	LINEIN_R
8	GND
9	GND
10	NC
11	LINEOUT_L
12	LINEOUT_R
13	GND
14	GND

Speaker Connector (CN9)

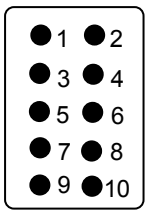
Pin	Signal
1	SPK_R-
2	SPK_R+
3	SPK_L+
4	SPK_L-

RS-232 Serial Port Connector (CN10、CN11、CN12、CN13、CN14)

Pin	Signal
1	DCD#
2	DSR#
3	RXD
4	RTS
5	TXD
6	CTS#
7	DTR#
8	RI#
9	GND

USB Connector (CN15,CN16)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	DATA0-	4	GND
5	DATA0+	6	DATA1+
7	GND	8	DATA1-
9	GND	10	+5V



PS2 Keyboard and Mouse Connector (CN17)

Pin	Signal
1	KBDATA
2	KBCLK
3	GND
4	+5V
5	MSDATA
6	MSCLK

LVDS Connector (CN18)

Pin	Signal	Pin	Signal
1	LVDS_BKLEN	2	LVDS_BKLCTL
3	PPVCC	4	GND
5	LVDS_TXLCLK#	6	LVDS_TXLCLK
7	PPVCC	8	GND
9	LVDS_TXL0#	10	LVDS_TXL0
11	LVDS_TXL1#	12	LVDS_TXL1
13	LVDS_TXL2#	14	LVDS_TXL2
15	LVDS_TXL3#	16	LVDS_TXL3
17	LVDS_DDCPDATA	18	LVDS_DDCPCLK
19	LVDS_TXU0#	20	LVDS_TXU0
21	LVDS_TXU1#	22	LVDS_TXU1
23	LVDS_TXU2#	24	LVDS_TXU2
25	LVDS_TXU3#	26	LVDS_TXU3
27	PPVCC	28	GND
29	LVDS_TXUCLK#	30	LVDS_TXLCLK

Fan Connector (CN19)

Pin	Signal
1	GND
2	Fan control
3	Fan-IN

Backlight Connector (CN25)

Pin	Signal
1	Backlight Voltage Input
2	Backlight control
3	GND
4	GND
5	Backlight Enable

VGA Connector (CN26)

Pin	Signal
1	VSYNC
2	HSYNC
3	GND
4	DDC_SCL
5	DDC_SDA
6	CRT_PLUG
7	BLUE
8	GND
9	GREEN
10	GND
11	RED
12	GND
13	+5V

Battery Connector (CN27)

Pin	Signal
1	RTCBAT
2	GND

3.0 AMI BIOS SETUP

AMI BIOS Setup

AMI BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM so that it retains the Setup information when the power is turned off.

Entering Setup

Power on the computer and press <Del> or <F2> immediately. This will allow you to enter Setup.

Main

Set the date, use tab to switch between date elements.

Advanced

Enable disable boot option for legacy network devices.

Chipset

host bridge parameters.

Boot

Enables/disable quiet boot option.

Security

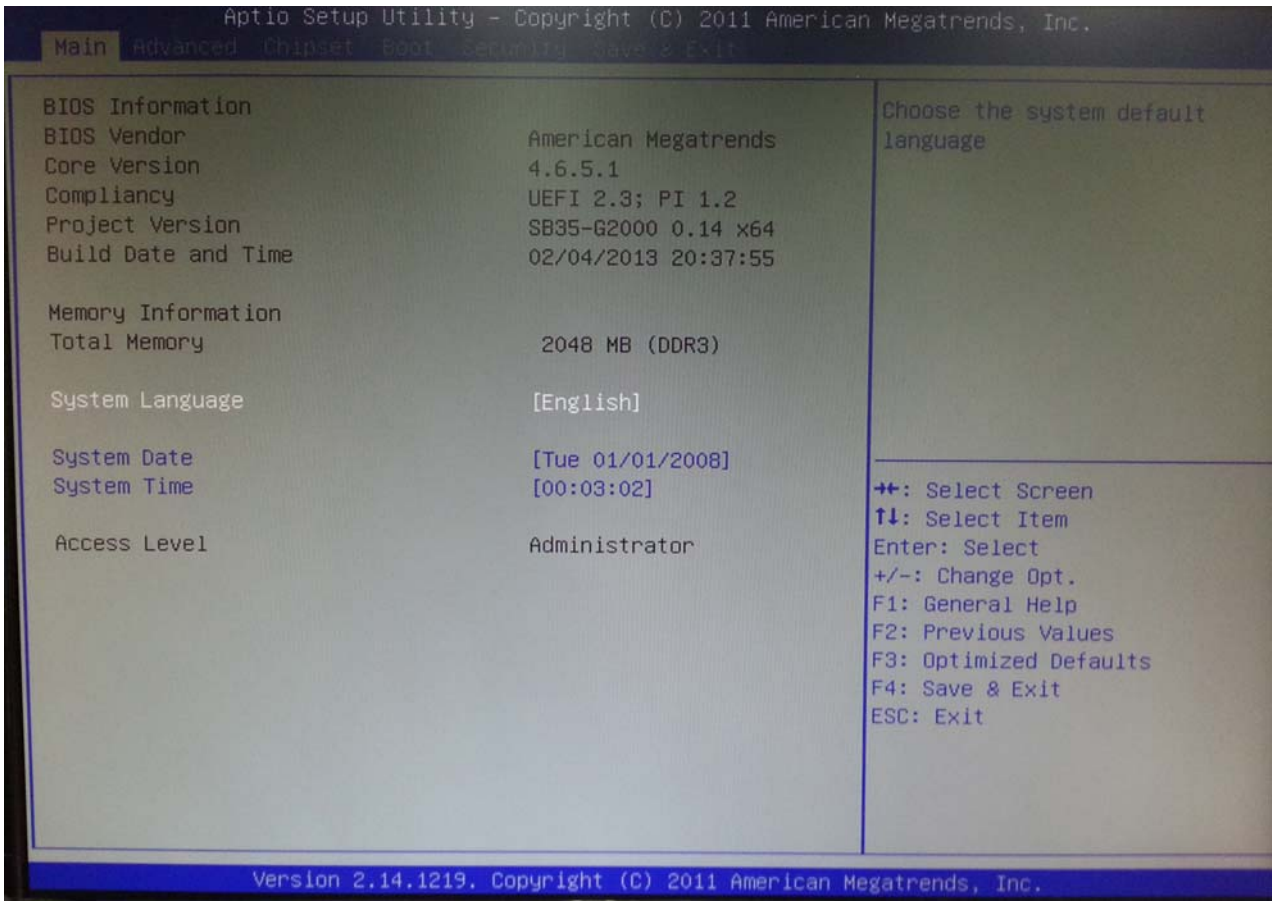
Set setup administrator password.

Save&Exit

Exit system setup after saving the changes.

Setup 1: The Main BIOS Menu.

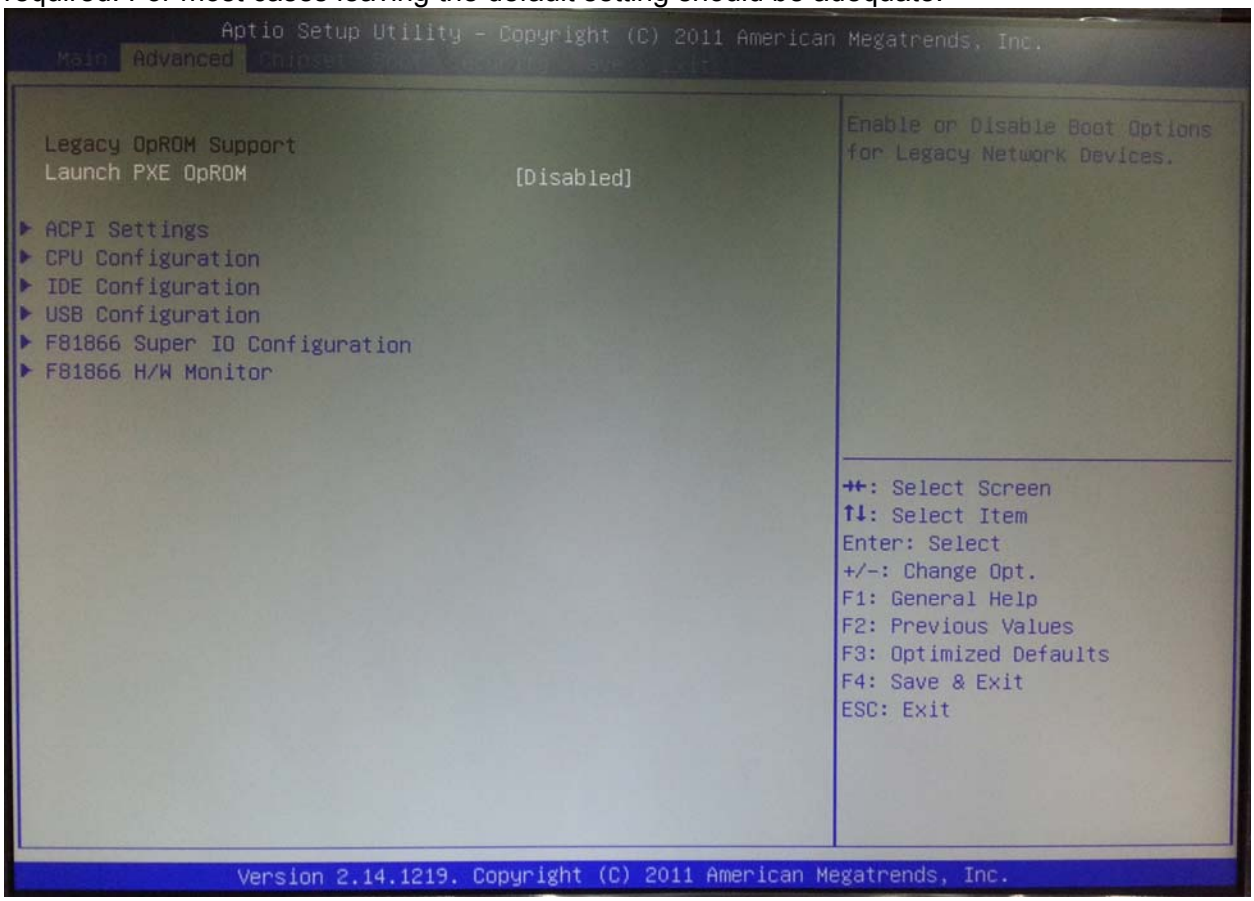
The sections that follow provide guidelines on how to set up the various settings in each section of the BIOS. We have concentrated only on those settings that may need changing, if a setting does not appear in this document, leave it as you found it.
Press Enter on a main menu option to go into that section.
To return to the Main Menu from within a section, press Escape.



▲The Main BIOS Menu

Setup 2: Advanced BIOS Features

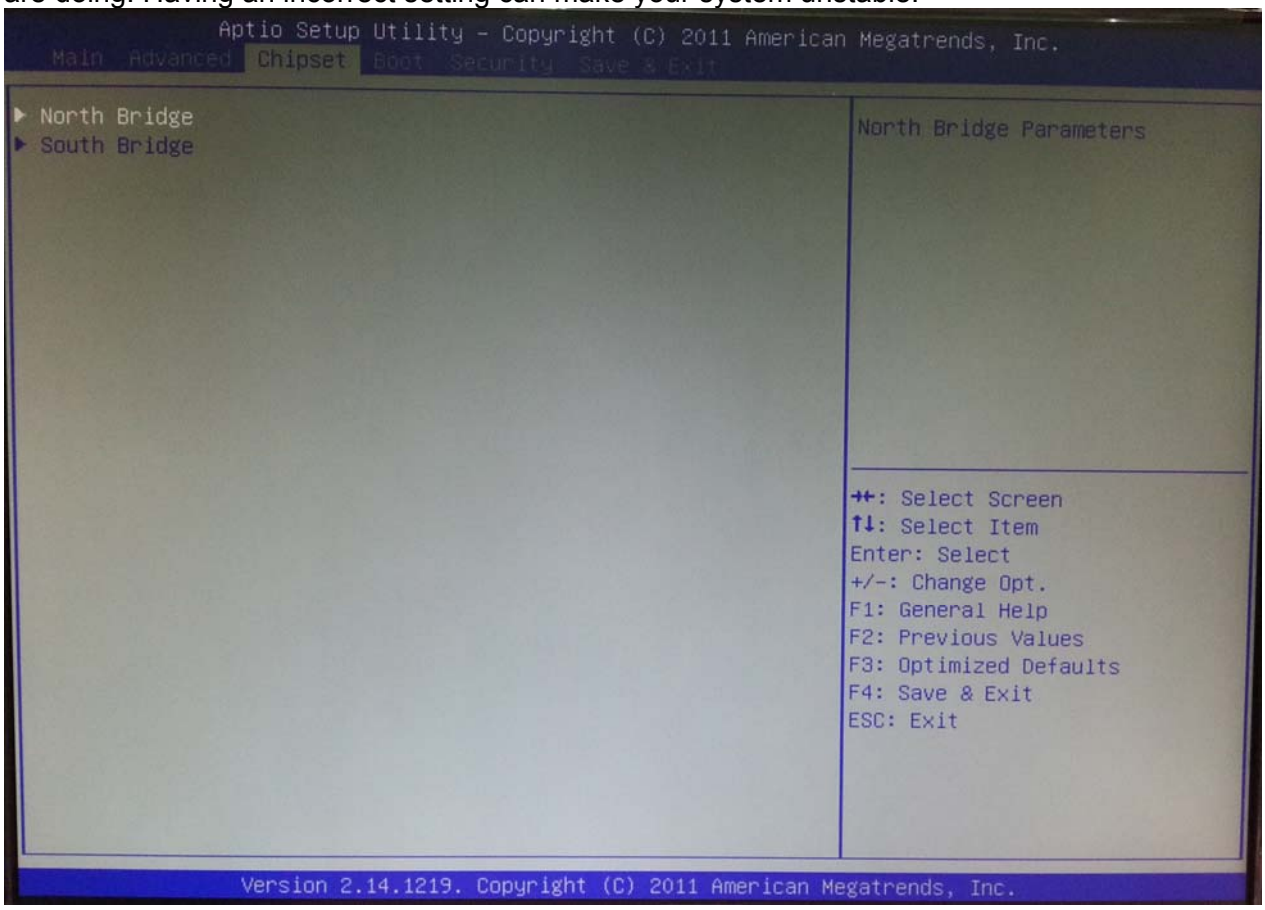
As you can see from screen 2, there are numerous advance settings which you can select if required. For most cases leaving the default setting should be adequate.



▲ Advanced BIOS Features

Setup 3: Chipset

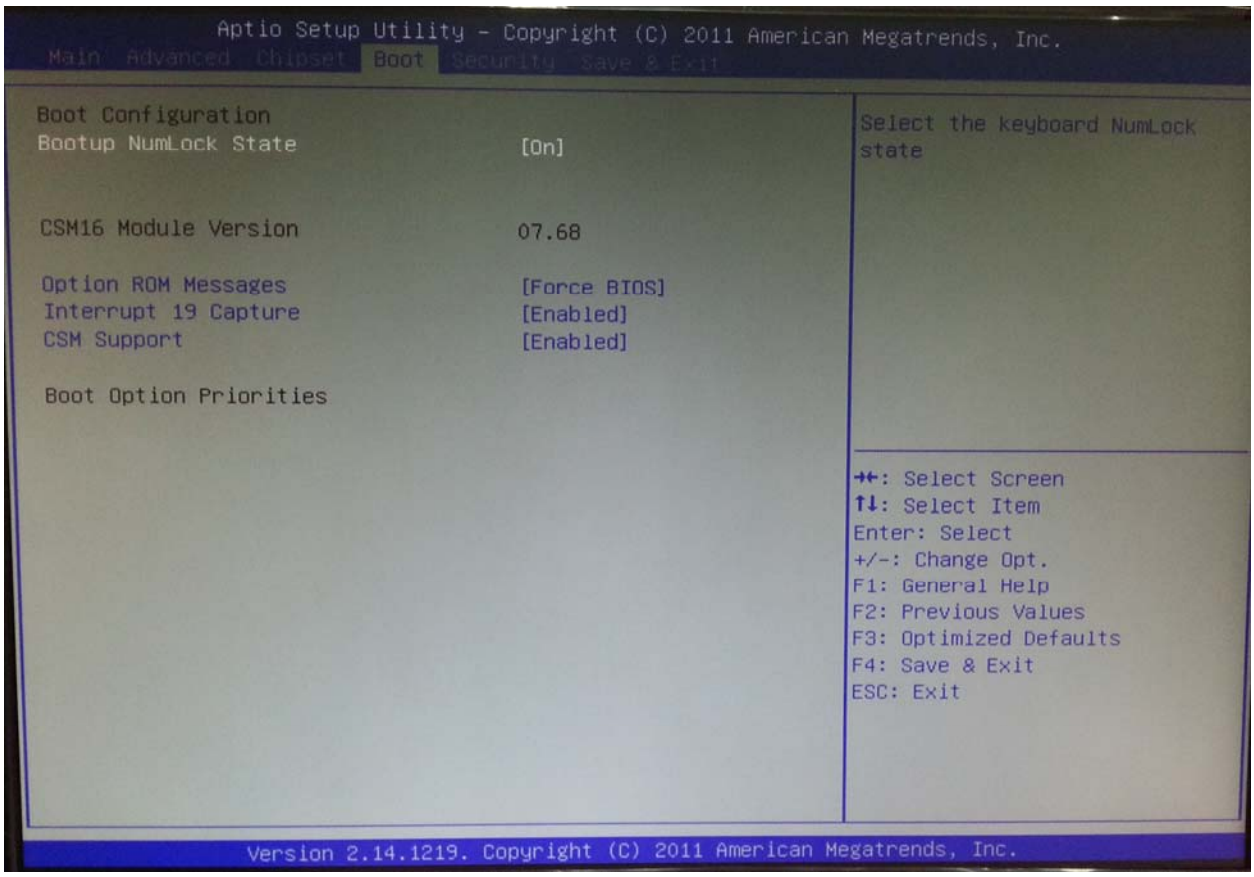
Here you can setup the contents of the chipset buffers. It is closely related to the hardware and is therefore recommended that you leave the default setting unless you know what you are doing. Having an incorrect setting can make your system unstable.



▲ Chipset

Setup 4: Boot

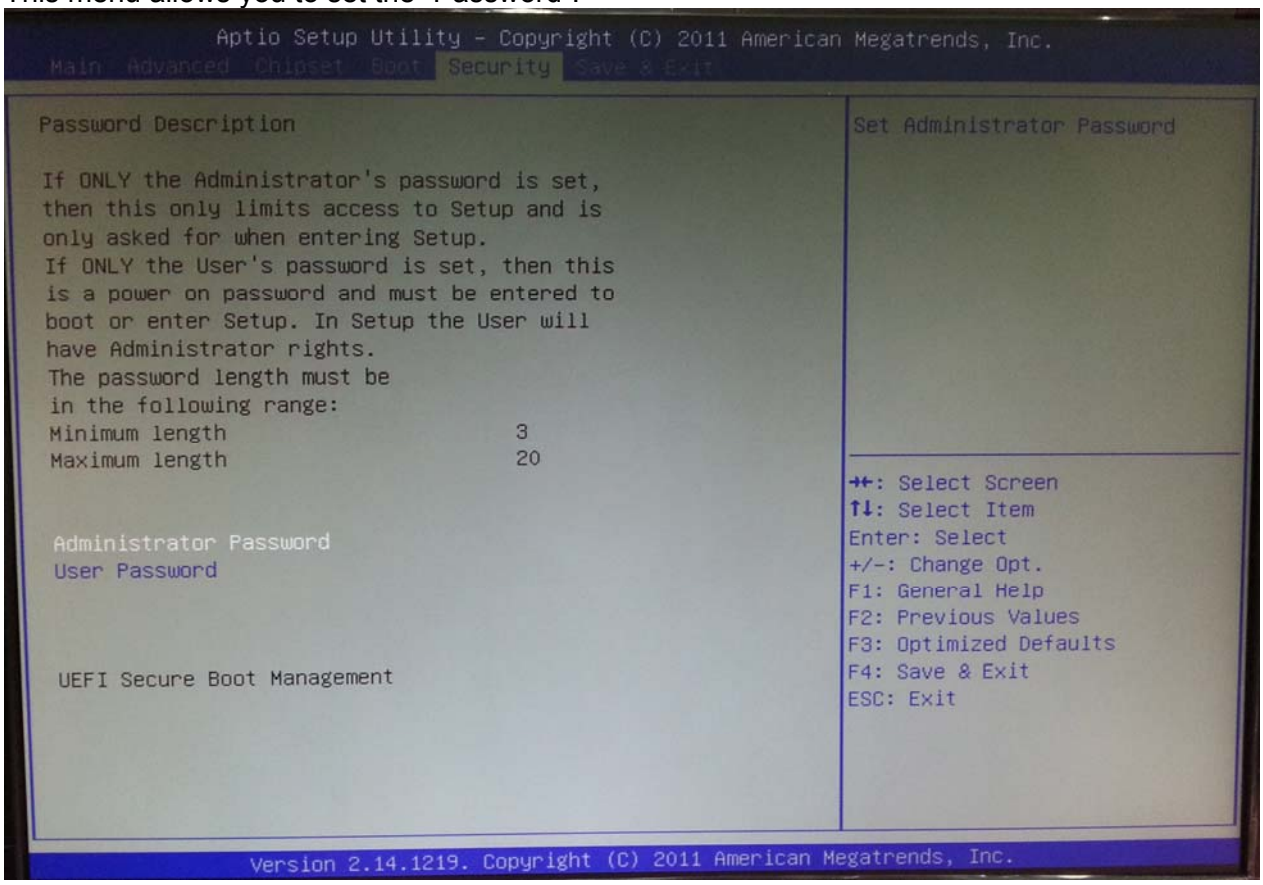
This menu allows you to set the “Boot Configuration”. You can make changes as necessary.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Bootup NumLock State [On]
CSM16 Module Version 07.68
Option ROM Messages [Force BIOS]
Interrupt 19 Capture [Enabled]
CSM Support [Enabled]
Boot Option Priorities
Select the keyboard NumLock state
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

▲ Boot

Setup 5: Power Management Setup

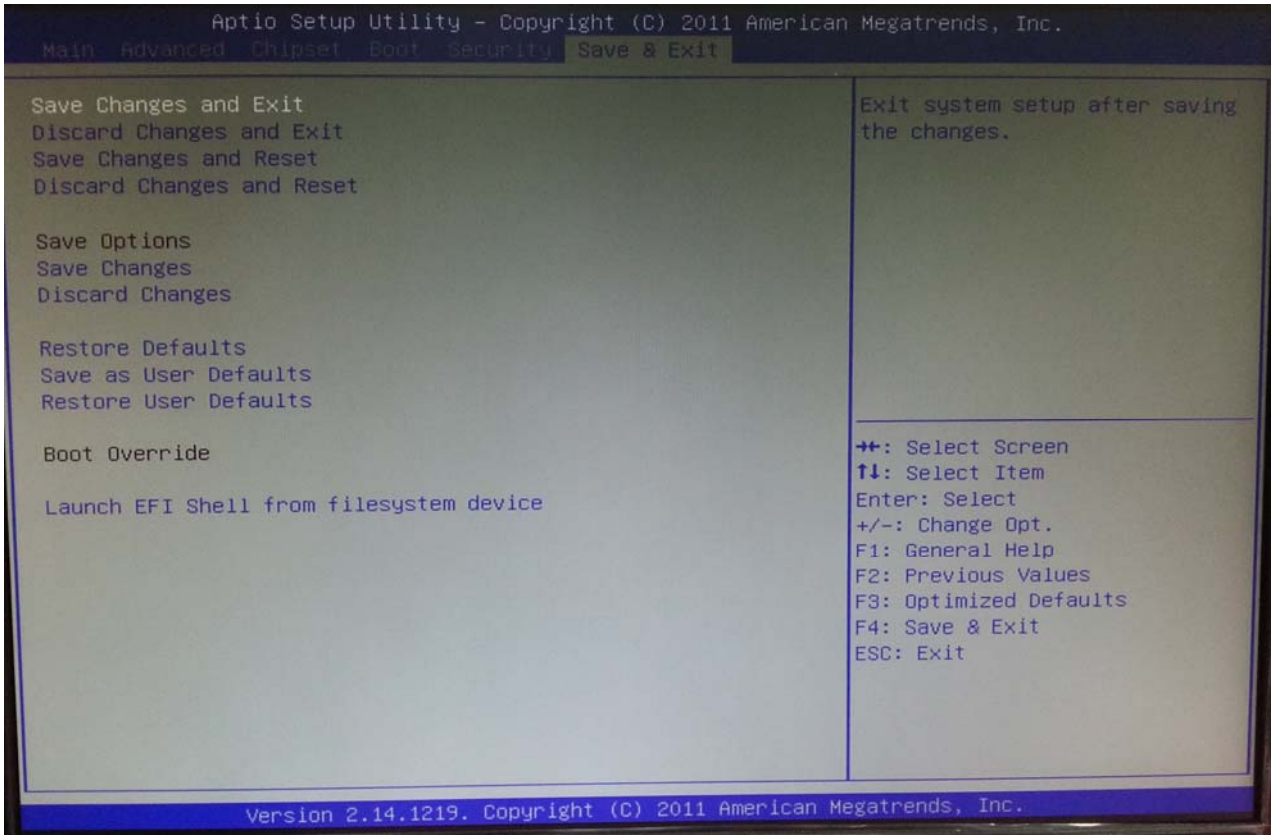
This menu allows you to set the “Password”.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
UEFI Secure Boot Management
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

▲ Power Management Setup

Setup 6: Save and Exit Setup

To save any changes you made to the BIOS you must choose this option.



▲ Save and Exit Setup

4.0 DRIVER INSTALLATION

The SB35-G2000 comes with a DVD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:
Step 1 – Install APU Driver
Step 2 – Install LAN Driver
Step 3 – Install Audio Driver

USB 2.0 Drivers are available for download using Windows Update for both Windows XP and Windows 2000. For additional information regarding USB 2.0 support in Windows XP and Windows 2000, please visit www.microsoft.com/hwdev/usb/.

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the SB35-G2000 DVD-ROM into the DVD-ROM Drive. And install the drivers from Step 1 to Step 3 in order.

Step 1 – Install Intel APU Driver
1. Click on the ***APU Driver*** folder and select the OS folder your system is
2. Double click on the ***setup.exe*** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 2 – Install Intel LAN Driver
1. Click on the ***Ethernet Driver*** folder and select the OS folder your system is
2. Double click on the ***setup.exe*** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 – Install Audio Driver

1. Click on the ***Audio Driver*** folder and select the OS folder your system is
2. Double click on the ***setup.exe*** located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically